

### **REMARKS/ARGUMENTS**

Claims 1-16, 19-48 and 50-65 were pending in the present application before this amendment as set forth above. By this amendment, claims 1, 33 and 60 are amended.

In the January 5, 2010 Office Action (hereinafter "Office Action"), claims 1-5, 8-16, 19-22, 33-38, 41-48 and 50-65 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Pub. No. 2003/0003571 to Kanegasaki et al. (hereinafter "Kanegasaki"), in view of U.S. Patent No. 5,520,787 to Hanagan et al. (hereinafter "Hanagan"). In addition, claims 25-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki and Hanagan, and further in view of U.S. Patent Pub. No. 2004/0142409 to Allen et al. (hereinafter "Allen"). Also, claims 6, 7, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki and Hanagan, and further in view of U.S. Patent Pub. No. 2006/0194273 to Thomas (hereinafter "Thomas").

Applicant very much appreciates the Examiner's careful review of the instant application. Applicant particularly thanks Examiner Bowers and Primary Examiner Beisner for granting and conducting a telephone interview held March 30, 2010 with Dr. Tim Tingkang Xia and Mr. Christopher W. Glass, both Patent Attorneys for Applicant on the record. During the telephone interview, the Office Action was discussed, and particularly independent claims 1, 33 and 60 of the present invention and the cited references to Kanegasaki, Hanagan, and Allen. The Examiners agreed with Applicant's position that Kanegasaki relates to chemotaxis and does not disclose culturing living cells. Also, it was agreed that Allen claims a priority date that is later than August 27, 2002, the filing date of U.S. provisional patent application number 60/406,278, to which the present application claims priority. Applicant appreciates very much the professionalism shown by the Examiners during the telephone interview.

In response, as set forth above, claims 1, 33 and 60 have been amended for better form. Support for the amendments can be found in the disclosure as originally filed, for example in paragraphs on page 18, lines 16-24 and page 19, lines 15-26 of the specification and in Figs. 1A, 1B, and 2 of the drawings. Applicant submits that no new matter has been added.

Any amendments to the claims not specifically referred to herein as being included for the purpose of distinguishing the claims from cited references are included for the purpose of clarification, consistence and/or grammatical correction only.

It is now believed that the application is in condition for allowance at least for the reasons set forth below and such allowance is respectfully requested.

The following remarks herein are considered to be responsive thereto.

***Rejections under 35 U.S.C. § 103 over Kanegasaki and Hanagan***

In the Office Action, claims 1-5, 8-16, 19-22, 33-38, 41-48 and 50-65 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki, in view of Hanagan. Applicant respectfully traverses these rejections for at least the reasons set forth below.

**Claims 1-16 and 19-32:**

Among other features, amended claim 1 recites, in part, “***a bioreactor for cultivating living cells*** in a liquid medium comprising: a first substrate having a first surface and an opposite second surface, defining ***a chamber*** therebetween ***for receiving and culturing the cells*** and receiving the liquid medium; a second substrate positioned adjacent to the first surface of the first substrate; a third substrate, wherein the third substrate is positioned adjacent to the second surface of the first substrate; ***and an electrochemical measuring system positioned in the third substrate and adapted for electrochemical measurements of the cells responsive to the liquid medium in at least one of the first subchamber and the second subchamber.***” (Emphasis added.)

In contrast, as understood by Applicant, Kanegasaki discloses “a well unit to be used in an apparatus whereby movements of cells based on their own actions can be accurately and easily detected, in case of ***detecting the chemotaxis of cells due to a chemotactic factor or the inhibition of the chemotaxis of cells by an inhibitor.***” (Kanegasaki, [0009].) (Emphasis added.) As conceded by the Examiner in the telephonic interview held March 30, 2010, ***Kanegasaki relates to chemotaxis and does not disclose culturing living cells.*** Moreover, the Examiner concedes on page 3 of the Office Action that ***Kanegasaki does not disclose that the third substrate includes a means for electrochemical measurement.*** Therefore, Kanegasaki does not disclose, teach, or suggest a bioreactor having all of the features recited in amended claim 1.

Hanagan, as understood by Applicant, discloses “a diagnostic flow cell for determining the presence or amount of an analyte in a test sample...[comprising] (i) a spacing layer disposed

between a first and a second opposed substrate, wherein the spacing layer has a longitudinal void and wherein the spacing layer and opposed substrates define a flow channel; (ii) fastening means for coupling the spacing layer and the opposed substrates; (iii) inlet means for permitting a sample to enter the flow channel; (iv) outlet means for permitting the sample to exit the flow channel; and (v) immobilized reagent means for producing a detectible signal, wherein the reagent means is at least partially contained within the flow channel.” (Hanagan, Col. 1, lines 54-66.) Hanagan does not disclose, teach, or suggest a bioreactor having all of the features recited in amended claim 1, taken alone or in combination with Kanegasaki.

For at least the reasons set forth above, Applicant respectfully submits that the Examiner has failed to make a *prima facie* case to support the rejection of claim 1 under 35 U.S.C. §103(a) over Kanegasaki and/or Hanagan. First, there is no suggestion or motivation to modify the references or combine the reference teachings. Second, there is no reasonable expectation of success of combining the reference teachings. Finally, the combination of references does not teach or suggest all elements of Applicant’s claims.

In supporting the obviousness rejections under 35 U.S.C. §103, the Examiner “bears *the initial burden...of presenting a prima facie case of unpatentability*...After evidence or argument is submitted by the applicant in response, patentability is determined *on the totality of the record*.” *Ex parte Wada and Murphy*, BPAI Appeal No. 2007-3733 (January 14, 2008), and “*Office personnel must articulate*”, among other things, “*a finding that the prior art included each element claimed ...*”, MPEP 2143 (A)(1). The “*unwitting application of hindsight*” is *inappropriate*. *Ex parte So and Thomas*, BPAI Appeal No. 2007-3967 (January 4, 2008). In other words, the Examiner’s “rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). (MPEP § 2142). (Emphasis added.)

For at least the foregoing reasons, Applicant respectfully submits that claim 1, as amended, is patentable under 35 U.S.C. §103(a) over any combination of Kanegasaki and/or Hanagan.

Accordingly, claims 2-16 and 19-32, which depend from now allowable independent claim 1, are also patentable for at least this reason.

Claims 2-16 and 19-32 also contain additional patentable subject matter. For example, claim 22 recites, in part, a bioreactor “wherein the plurality of individually addressable working electrodes are further adapted for *measuring the metabolic variables* related to the cells”. (Emphasis added.) None of Kanegasaki, Hanagan, or any of the other cited references, taken alone or in combination, disclose, teach, or suggest a bioreactor having these limitations, taken alone or in combination with the limitations recited in amended independent claim 1 and/or the intervening claims. Accordingly, individual consideration and allowance of each claim is respectfully requested.

**Claims 33-48 and 50-59:**

Among other features, amended claim 33 recites “*a bioreactor for cultivating living cells* in a liquid medium comprising: a substrate having a first surface and an opposite second surface, defining *a chamber* therebetween *for receiving and culturing the cells* and receiving the liquid medium, wherein the chamber is formed with a center and a boundary; [and]...*means for electrochemical measurements of the cells responsive to the liquid medium in at least one of the outer chamber, the intermediate chamber and the central chamber.*” (Emphasis added.) Incorporating herewith the reasons set forth above why amended claim 1 is patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Hanagan, Applicant respectfully submits that amended claim 33 is also patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Hanagan for at least these reasons.

Accordingly, claims 34-48 and 50-59, which depend from now allowable independent claim 33, are also patentable for at least this reason.

Claims 34-48 and 50-59 also contain additional patentable subject matter. For example, claim 52 recites, in part, a bioreactor “wherein the first group of individually addressable working electrodes are further adapted for *measuring the metabolic variables* related to the cells”. (Emphasis added.) None of Kanegasaki, Hanagan, and/or any of the other cited references disclose, teach, or suggest a bioreactor having these features of claim 52, taken alone or in combination with the features recited in amended claim 33. Accordingly, individual consideration and allowance of each claim is respectfully requested.

**Claims 60-65:**

Among other features, amended claim 60 recites “*a bioreactor for cultivating living cells in a liquid medium comprising: a substrate having a first surface and an opposite second surface, defining a chamber therebetween for receiving and culturing the cells, and receiving the liquid medium with a boundary [and]...means for electrochemical measurements of the cells responsive to the liquid medium in at least one of the plurality of chambers, wherein each of the plurality of subchambers is in fluid communication with at least another one of the plurality of subchambers.*” (Emphasis added.)

Incorporating herewith the reasons set forth above why previously presented independent claim 33 is patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Hanagan, Applicant respectfully submits that amended claim 60 is also patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Hanagan for at least these reasons.

Accordingly, claims 61-65, which depend from now allowable independent claim 60, are also patentable for at least this reason.

**Rejections under 35 U.S.C. § 103 over Kanegasaki, Hanagan, and Allen**

In the Office Action, claims 25-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki and Hanagan, and further in view of Allen. Applicant respectfully traverses this rejection. Applicant respectfully submits that Allen is not a qualified reference because Allen claims a priority date of October 21, 2002 from U.S. provisional patent application number 60/420,078, which is later than August 27, 2002, the filing date of U.S. provisional patent application number 60/406,278, to which the present application claims priority. Thus, claims 25-32 are submitted to contain patentable subject matter in their own merits. Moreover, even assuming that Allen were a qualified reference, which Applicant submits that it is not, as set forth above, claims 25-32 depend from now allowable independent claim 1 and are therefore patentable under 35 U.S.C. § 103(a) over Kanegasaki, Hanagan, and/or Allen for at least this reason.

***Rejections under 35 U.S.C. § 103 over Kanegasaki, Hanagan, and Thomas***

In the Office Action, claims 6, 7, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki and Hanagan, and further in view of Thomas. However, these rejections are moot in light of amendments to now allowable independent claims 1 and 33. As set forth above, claims 6 and 7 depend from now allowable independent claim 1, and claims 39 and 40 depend from now allowable independent claim 33. Accordingly, claims 6, 7, 39 and 40 are also patentable for at least this reason.

Further, even assuming that these rejections were not rendered moot for these reasons, Applicant respectfully submits that claims 6, 7, 39 and 40 are allowable over any combination of Kanegasaki, Hanagan, and/or Thomas for at least the additional reason that Thomas fails to cure the deficiencies of Kanegasaki and/or Hanagan. As understood by Applicant, Thomas discloses an apparatus and methods for cell-based assays. (see, e.g. Thomas, [0002].) Thomas does not disclose, teach, or suggest a bioreactor having all of the features recited in claims 6, 7, 39 and 40, taken alone or in combination with the features recited in amended independent claims 1 and 33. Accordingly, individual consideration and allowance of each claim is respectfully requested.

### CONCLUSION

Applicant respectfully submits that the foregoing Response places this application in condition for allowance. If the Examiner believes that there are any issues that can be resolved by a telephone conference, or that there are any informalities that can be corrected by an Examiner's amendment, to facilitate the prosecution, please call the undersigned at 404.495.3678. No fee is due, but the Commissioner is hereby authorized to charge any petition fee under 37 CFR 1.17(f),(g) or (h) or any deficiency of fees and credit of any overpayments to Deposit Account No. 50-3537.

Respectfully submitted,

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